

Code Division Multiple Access Wireless System With Time Reversed  
Spaced Time Block Transmitter Diversity Encoding

ABSTRACT OF THE DISCLOSURE

[0056] A wireless communication network (10) comprising a wireless transmitter (12). The transmitter comprises a plurality of antennas (AT1<sub>1</sub>, AT1<sub>2</sub>), wherein each of the plurality of antennas is operable for transmitting signals. The transmitter also comprises, for each of a plurality of different user channels ( $D^n$ ), circuitry (22<sup>n</sup>) for providing a plurality of groups of symbols in a first symbol group sequence ( $D_1^n$ ). The transmitter also comprises, for each of the plurality of different user channels, circuitry (24<sup>n</sup>) for forming a first modulated symbol group sequence for the user channel by modulating the symbols in the first symbol group sequence for the user channel with a unique code that corresponds to the user channel and distinguishes the user channel from each other of the plurality of different user channels and circuitry (26<sub>1</sub>) for combining the first modulated symbol group sequences and providing them for transmission by a first antenna (AT1<sub>1</sub>). The transmitter also comprises, for each of the plurality of different user channels, circuitry (22<sup>n</sup>) for forming a second symbol group sequence ( $D_2^n$ ) by re-ordering the groups of symbols in the first symbol group sequence and further by time reversing symbols in at least some of the groups of symbols. Also for each of the plurality of different user channels, the transmitter comprises circuitry (24<sup>n</sup>) for forming a second modulated symbol group sequence for the user channel by modulating the symbols in the second symbol group sequence for the user channel with a unique code that corresponds to the user and distinguishes the user from each other of the plurality of different user channels. Finally, the transmitter comprises circuitry (26<sub>2</sub>) for combining the second modulated symbol group sequences and providing them for transmission by the second antenna (AT1<sub>2</sub>).